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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/660,332	09/11/2003	John R. Clark	UMO 0212 PUSP 1	5971
22045	7590	04/28/2004	EXAMINER	
BROOKS KUSHMAN P.C. 1000 TOWN CENTER TWENTY-SECOND FLOOR SOUTHFIELD, MI 48075			SUMMONS, BARBARA	
			ART UNIT	PAPER NUMBER
			2817	

DATE MAILED: 04/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/660,332	Applicant(s) CLARK ET AL.	
	Examiner Barbara Summons	Art Unit 2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2003 (pre-amdt.).
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 33-72 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 33-68 and 70-72 is/are rejected.
- 7) ☒ Claim(s) 69 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>9/11/03</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to because in Fig. 6, the "fins" are incorrectly labeled "52" and should be labeled - - 62 - - (see the specification at pg. 13, Ins. 4-5). Note that label "52" has already been used to indicate the anti-node portion of the disk "53" (ibid. and Fig. 5). A proposed drawing correction labeled "annotated drawing" or corrected drawings labeled "Replacement Sheet" are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

2. The disclosure is objected to because of the following informalities:

The first paragraph of the specification needs to be updated and corrected to include the U.S. Patent No. of the parent application and to delete the extra "This application". In other words, the first paragraph of the specification should begin:

- - This application is a continuation of application serial number 09/938,358 filed on August 23, 2001, now U.S. Pat. No. 6,628,177, which [This application] claims the benefits of U.S. provisional... - -.

On page 13, line 6, note that "disk 52" should be - - disk 53 - - (see e.g. line 5).

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 41 and 42 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 41 recites the limitation "the at least one nodal point" on lines 1-2. There is insufficient antecedent basis for this limitation in the claims.

Claim 42 recites the limitation "the support structure" on line 1. There is insufficient antecedent basis for this limitation in the claims.

### ***Double Patenting***

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 33-58, 60-68 and 70-72 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-11 of U.S. Patent No. 6,628,177 in view of the article by Fujita et al. "Disk-Shaped Bulk Micromachined Gyroscope... (cited by Applicants)[of record].

Claims 1-11 of the '177 patent recite substantially similar subject matter of the claims of the instant application (IA). Specifically: claim 1 of '177 covers the subject

Art Unit: 2817

matter of claims 33 and 34 of IA; claim 2 of '177 covers claims 37 and 39 of IA; claim 3 of '177 covers claims 41, 42, 65, 66, 68, and 70-72 of IA; claim 4 of '177 covers claims 36, 37 and 45 of IA; claim 5 of '177 covers claim 46 of IA; claim 6 of '177 covers claims 48, 51-53 and 56 of IA; claim 7 of '177 covers claims 57 and 58 of IA; claim 8 of '177 covers claim 60 of IA; claim 9 of '177 covers claims 61 and 62 of IA; claim 10 of '177 covers claim 63 of IA; and claim 11 of '177 covers claim 64 of IA. Additionally, the mode shapes of flexural and contour/ radial-contour would have been obvious modes of disk shaped resonators as evidenced by the prior art of record and Fujita et al. Fujita et al. also shows the obviousness of other lacking structures of drive electrodes at the periphery of the resonator, the drive electrodes being split (i.e. interleaved comb-shaped) electrodes, the sense electrodes under the resonator, the resonator being silicon based, and the resonator having multiple support structures, for example, such modifications being obvious because the device would not function without drive/sense electrodes and support structures, or being art recognized interchangeable parts (e.g. diamond based as in '177 vs. silicon based in IA).

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 2817

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 33, 35, 37, 38, 40, 41, 43, 44, 47, 61, 65-67, 70 and 71 are rejected under 35 U.S.C. § 102(a) as being anticipated by the article by Fujita et al. "Disk-Shaped Bulk Micromachined Gyroscope..." (cited by Applicants)[of record].

Regarding claims 33 and 35, Figs. 1-3 of Fujita et al. disclose a micromechanical resonator device having at least one mode shape, the device comprising: a substrate (see e.g. the abstract, line 2); and a resonator disposed above the substrate (see also Fig. 4) and having a disk-shaped surface wherein the at least one mode shape involves a contour modification of the disk-shaped surface at resonance because the mode shape is a radial contour mode shape, as can be seen in Fig. 3. Regarding claims 37, 38, 40 and 70, the resonator device further comprises drive electrodes disposed about a periphery of the resonator, the drive electrodes defined by a capacitive comb shaped split electrode (i.e. comb actuators in Fig. 2) to allow electrostatic excitation of the resonator through a capacitive gap therebetween. Regarding claim 41, the resonator has at least one nodal point in the center of the resonator as best seen in Fig. 3. Regarding claims 43 and 44, the device has a plurality of the input drive electrodes/comb actuators, and a plurality of output sense electrodes Cx1, Cx2, Cy1, and Cy2 disposed on the substrate below the resonator (see e.g. the left column above Fig. 3) to sense an output based on motion of the resonator. Regarding claims 47 and

61, the resonator is silicon based (see e.g. the first page, the right column), and the output sensing electrodes Cx1, Cx2, Cy1, and Cy2 are disposed to sense the motion of the anti-nodal portions of the resonator that experience the most displacement as shown by Fig. 3. Regarding claims 65-67 and 71, the resonator is supported above the substrate at one or more discrete locations by multiple spring supports/anchors (see Fig. 2).

9. Claims 33, 36, 47-55, 57, 59, 61, 65, 66, 70 and 71 are rejected under 35 U.S.C. § 102(e) as being anticipated by Greywall U.S. 6,369,374 (of record).

Regarding claims 33 and 36, Fig. 1 of Grey wall discloses a micromechanical resonator device 10 having at least one mode shape, the device comprising: a substrate 20; and a resonator disposed above the substrate which has a disk-shaped resonator surface (i.e. the portion of membrane 30 that is above cavity 50 and resonates; see also col. 4, Ins. 36-37 and col. 6, ln. 29), wherein the resonator has at least one mode shape (see col. 5, Ins. 18-24) which is a flexural mode shape (i.e. resonating by flexing toward and away from the substrate, see col. 5, Ins. 19-20). Regarding claim 47, the device is silicon based (see col. 4, Ins. 32-36). Regarding claim 61, the resonator inherently has at least one anti-nodal portion where the resonator experiences the most displacement when driven, and the device further includes an optical sensing means for sensing motion of the entire resonator, which necessarily includes the anti-nodal portion (see e.g. col. 6, Ins. 30-36). [Note: Regarding the inherency of nodal and anti-nodal portions of the resonator see, for

example, evidence thereof in prior art cited by Applicants, reference U.S. 6,249,073 Figs. 3, 7a and 7b which show flexural vibration nodes and anti-nodes].

Regarding claims 48, 50, 51, 53 and 55, Fig. 4 of Greywall discloses multiple integrable filters 100 which are band pass filters (see e.g. col. 1, Ins. 53-55) comprising: a substrate 90; an input resonator with a disk-shaped surface (i.e. connected to source signal pad 70, see col. 2, lines 63-65); an output resonator with a disk-shaped surface (e.g. to the right of the input resonator in the six resonator filter, and connected to output pad 74); and in the case of the filters having more than two resonators, an intermediate resonator.

Regarding claims 52 and 54, the resonators are mechanically coupled by shared portion 34 of the resonator membrane 30 (see e.g. col. 3, lines 9-14), and the resonators are electrically coupled by traces 72. Regarding claims 57 and 70, a drive electrode structure 70 is formed on the substrate at a position (with trace 72 and an electrode formed on the resonator membrane) to allow electrostatic excitation (see col. 3, lines 57-59) of the input resonator, and a sense electrode structure 74 is similarly formed on the substrate at a position to sense output current based on motion of the output resonator. Regarding claim 59, the input resonator in the six resonator filter is mechanically connected to the output resonator to its right by a shared portion 34 of the resonator membrane 30 to make a bridged filter. Regarding claims 49, 65, 66 and 71, the resonator is supported above the substrate by support structures at one or more discrete locations (i.e. an infinite number of discrete locations around the outside edge of the resonator) by supporting structure/anchor layer 40 (see Fig. 1).



10. Claims 33, 35, 41, 65, 66, 68 and 70-72 are rejected under 35 U.S.C. § 102(b) as being anticipated by Furnival U.S. 3,612,922.

Regarding claims 33, 35 and 70, Fig. 3 of Furnival discloses a micromechanical resonator (see col. 1, lines 9-12) device having at least one mode shape, comprising: a substrate 10 (col. 2, lines 3-5); and a resonator 46 disposed above the substrate (see Fig. 2) and having a disk-shaped surface wherein the at least one mode shape is a radial contour mode shape (col. 1, lines 16-20) that involves a contour modification (i.e. movement) of the disk-shaped surface at resonance (col. 1, lines 14-21) initiated by the adjacent electrode (50,52).

Regarding claims 41, 65, 66, 68, 71 and 72, the resonator 46 is supported above the substrate 10 by an anchor rod 54 and bushing 56 provided at its center nodal point (see col. 2, lines 55-56).

#### ***Allowable Subject Matter***

11. Claim 69 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### ***Response to Arguments***

12. Applicant's preemptive arguments filed 9/11/03 have been fully considered but they are not persuasive.

Applicants argue that the resonator of Greywall does not have a "disk-shaped surface" because the membrane 30 extends beyond the circular portion of the offset 40 that has cavity 50 therebelow. This argument is not persuasive because the part of

Art Unit: 2817

membrane 30 that resonates and forms the resonator is only the disk-shaped circular surface of the membrane 30 that lies above cavity 50. That is, the resonator's surface is "disk-shaped" and the rest of membrane 30 that extends beyond offset 40 is irrelevant because it is not the resonator surface. Applicants apparently are arguing that in their resonator the "disk-shaped surface" has - - side edges - - or - - end faces - -, while the resonator of Greywall does not. However, such a feature is not required by the claims as now recited.

### **Conclusion**

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Novasensor WO 96/37784 (11-28-1996) was cited in the parent application and inadvertently omitted on the PTO-1449 submitted by Applicants.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Summons whose telephone number is (571) 272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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April 21, 2004



**BARBARA SUMMONS  
PRIMARY EXAMINER**